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Vol. 6 MARCH, 1941 No. 3

The AMERICAN HOROLOGIST

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THE AMERICAN HOROLOGIST

Official National Publication of the United Horological Association of America, Inc., and all its affiliates, who operate as a united body toward the advancement and upliftment of the Horological and Jewelry Industry.

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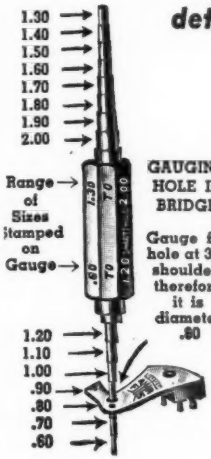

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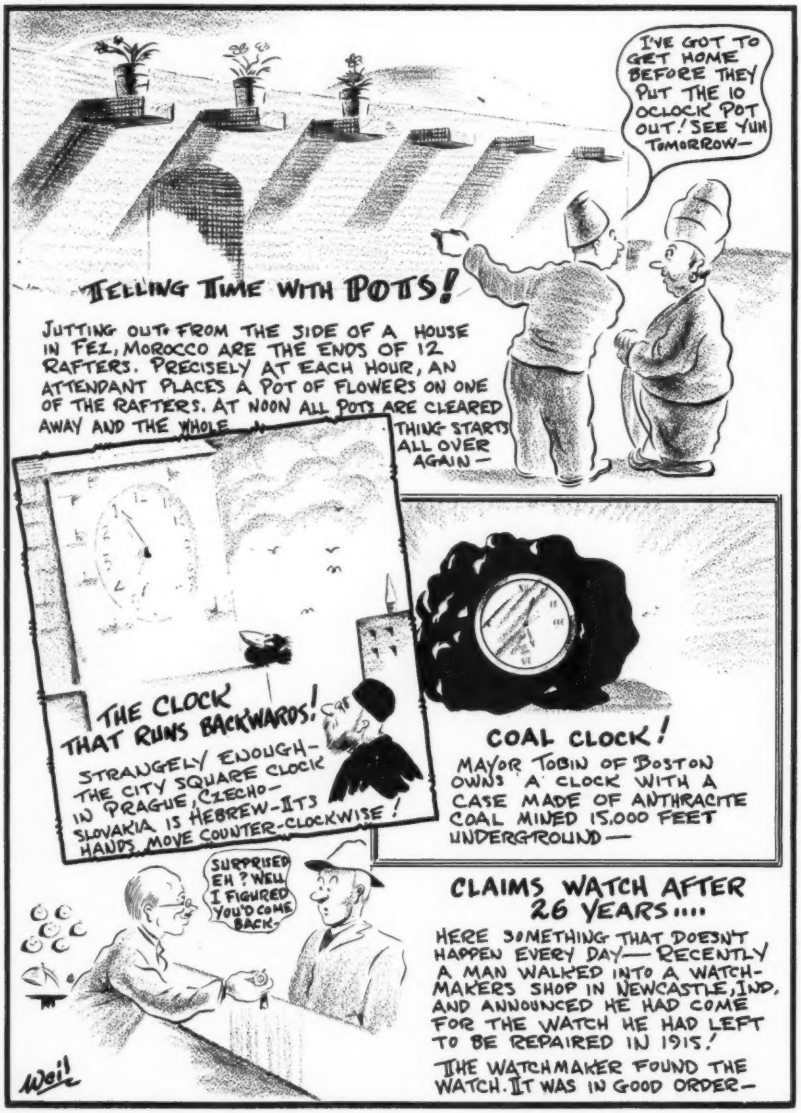
I'VE GOT TO GET HOME BEFORE THEY PUT THE 10 OCLOCK POT OUT! SEE YUH TOMORROW—
TELLING TIME WITH POTS!
JUTTING OUT FROM THE SIDE OF A HOUSE IN FEZ, MOROCCO ARE THE ENDS OF 12 RAFTERS. PRECISELY AT EACH HOUR, AN ATTENDANT PLACES A POT OF FLOWERS ON ONE OF THE RAFTERS. AT NOON ALL POTS ARE CLEARED AWAY AND THE WHOLE THING STARTS ALL OVER AGAIN—
THE CLOCK THAT RUNS BACKWARDS!
STRANGELY ENOUGH— THE CITY SQUARE CLOCK IN PRAGUE, CZECHO-SLOVAKIA IS HEBREW-ITS HANDS MOVE COUNTER-CLOCKWISE!
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MAYOR TOBIN OF BOSTON OWNS A CLOCK WITH A CASE MADE OF ANTHRACITE COAL MINED 15,000 FEET UNDERGROUND—
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Making A Balance Staff

By Harold C. Kelly
Member National Technical Board

Many horologists consider the making of a balance staff a difficult task. We find workmen doing almost anything to a watch to avoid the necessity of making a staff. Balance bridges are bent up or down. Unsightly graver marks are found on plates and bridges. The balance arms are sometimes bent out of line in an attempt to permit the balance to clear the various parts and pivots are often ground too short. However the making of a staff is not difficult if the repairman would go about learning the art the same as any other arduous task. No one ever learned to play a musical instrument in a few lessons or ever became an expert engraver in a few months.

Gravers for Turning Staffs—Three gravers of the styles shown in Figure 1 are needed for staff work. **A** is for general use, suitable also for square shoulders and the cylindrical portion of cone pivots. **B** has a rounded point for turning the cone portion of the pivot. **C** has the point flattened and is used for turning the lower end of the staff prior to cutting it off.

Sharpening the Gravers—Sharpening the gravers does not seem to be given the attention by the average horologist that it should. We have seen workmen trying to cut a square shoulder pivot with a graver having a point like a wire nail. Naturally their work was unsuccessful, yet these workmen did not reflect on the fact that possibly the graver was at fault.

The graver must have a sharp point. Even the best gravers cannot retain a keen edge very long while cutting tempered steel. Therefore keep a sharpening stone handy and make frequent use of it.

Some workmen use an emory or carborundum wheel to grind gravers. This should never be done as the point of the graver is frequently softened and this point is the most important part. Instead we use two stones, a soft Arkansas stone and a hard Arkansas stone. The soft stone is for rapid cutting and the hard stone is for the final finishing. After grinding the face, slide the sides on the stone so as to produce a flat and smooth cutting surface.

Making Pivots for Practice—It is well for the beginner to practice making square shoulder and cone pivots before attempting the making of a staff. The student should secure some pivot wire using the larger pieces. It will be found that pivot wire is excellent for the purpose as the wire is hardened and tempered ready for use.

For cone pivots the usual rule is that the cylindrical portion is twice as long as its diameter. For square shoulder pivots the length is three times the diameter.

The grinding and polishing will be considered when we arrive at that place in our work.

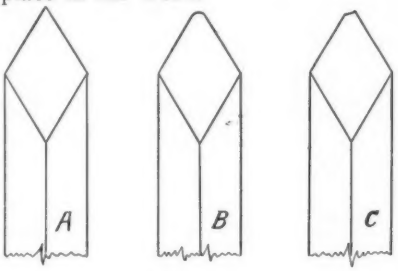

Figure 1

Measuring for the Staff—Now returning to our problem of staff making, the first act is to take the necessary measurements, preferrably from the watch for the reason that the old staff may not be correct. The well-known Boley gauge serves the purpose very well since it reads both ways, between the callipers and from the end of the foot. See that the balance bridge lies flat with the lower plate. Now remove the cap jewels. Make certain that the hole jewels are securely pushed in place. For the full

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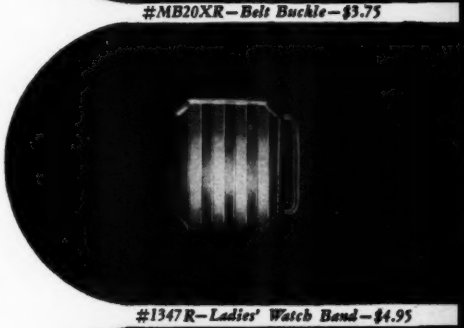

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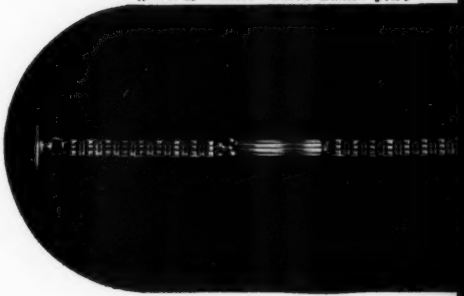

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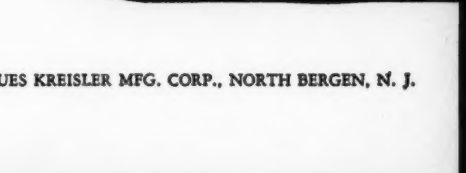

**A nationwide cross section of credit and cash retail jewelers. Names on file.*

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length of the staff (A, Figure 2) measure from the side of the lower hole jewel to the side of the upper hole jewel. The height of the seat for the roller table **B** is found by measuring the distance from the side of the lower hole jewel to the top of the lever, adding enough for clearance and the thickness of the roller table. In like manner the distance for the balance seat **C** is measured from the side of the lower hole jewel to the top of the pallet bridge and adding for the necessary clearance. The length of the upper end of the staff **D** is found by subtracting the length of the lower end to balance seat **C** from the full length **A**.

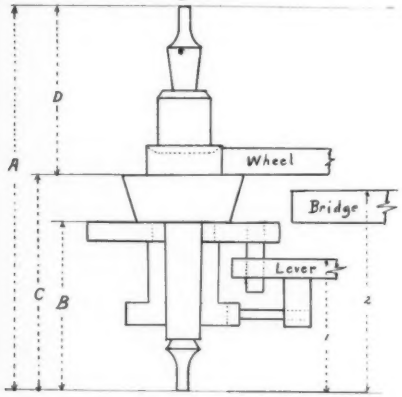

Figure 2

Preparing the Steel—Preparing the steel wire for our staff is next in order. Select a piece of steel, the diameter of which is a little larger than the largest part of the staff when finished. Heat over a gas flame to a cherry red and plunge quickly into cold water. This should be done in a rather dark place so as to see better the degree of heat, for if the light is too bright, one is apt to over heat the steel and thereby ruin it.

The wire is now too hard to turn and we must therefore draw the temper. The wire must be made white in order to blue it. This is done in the lathe by holding a piece of fine emery paper or buff stick against the wire.

The tempering is done by drawing the wire through the flame of an alcohol lamp, or, better still, lay the wire on a curved sheet of copper keeping the wire rolling while being held above the lamp. A full blue color is satisfactory for staffs.

Turning the Staff—Tighten the wire securely in the lathe having extended the wire from the chuck sufficient to include the full length of the staff and about two millimeters additional. With the hand graver turn the upper end; first turning the balance seat to length from the end and almost size, say .05 of a millimeter of the finished diameter. Next turn the collet axis, followed by turning the remaining end nearly to the size of the hole in the roller table.

Turning a Cone Pivot—Turn the cylindrical portion of the pivot almost to size. Next using the graver with the point slightly rounded turn the cone, bringing it down to meet the cylindrical portion of the pivots. This is followed by cutting the slope between the collet axis and cone of the pivot.

The turning of the upper end of the staff is now completed and we are ready for the pivot polisher and the preparation of the grinding mediums.

The Pivot Polisher—The pivot polisher is a very neat little instrument for grinding and polishing. The superiority of the instrument over any hand method is unquestionable, it does the work in a factory like manner and polishes the pivot most beautifully. It is to be regretted that the pivot polisher is not more generally used.

However the successful use of the pivot polisher depends largely on the proper preparation of the laps and we must therefore digress for a moment and describe the method of making the laps and their preparation and uses.

The horologist should make his

own laps. The taper chuck shown in Figure 3 is required for the purpose. Material for the laps may be purchased from material houses or hardware stores. We need laps of cast iron, bell metal and boxwood.

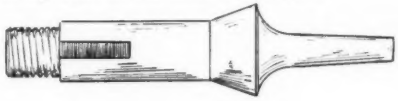

Figure 3

Cast Iron and Bell Metal Laps—Laps made of cast iron and bell metal are used principally for grinding. The material may be purchased in rods of various diameters. For most needs of the horologists, rods of about $\frac{5}{8}$ inch diameter will suffice. Having selected the material desired, saw off a piece about a half inch long and bore a hole in it of the proper size. The hole is reamed out with a reamer of the correct taper and the blank is placed on the taper chuck for turning with the slide rest. Laps of various shapes are needed as shown in Figure 4.

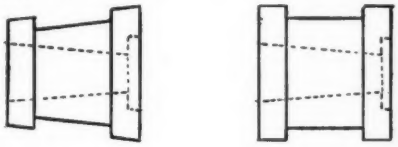

Figure 4

The laps are now turned up. The face and sides must be filed to enable the lap to hold the grinding or polishing medium. Filing, it is admitted, has a tendency to destroy its truth, yet this is necessary in order to do good work. Experience has shown, however, that it is possible to file a lap many times and still run practically true. File the lap by laying it face down on a Number 4 or 5 file. Holding the lap between the thumb and fingers, slide the lap along the cutting teeth of the file about an inch or so. The lap should then be turned partly around and another stroke made. This crosses the lines providing a suitable surface for the embedding of the abrasive medium. Next prepare the side of the lap. This is done by drawing the lap on the file as shown by the arrow in Figure 5. Continue in this manner until the entire circumference is filed.

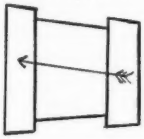

Figure 5

Boxwood Laps—Boxwood laps are used for putting a high polish on steel. We may use the slide rest in turning the boxwood in the same manner as we did in preparing the cast iron and bell metal laps. It is important that the grain of the wood run parallel with the hole in the lap

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so that the end of the grain touches the work. The lap is filed on the face only with a Number 0 file.

Preparing the Grinding Material—Now that our laps are ready, the preparation of the grinding medium is next in order. We proceed as follows: Apply small quantity of oil stone powder to the first story of our three story polishing block. Add a little watch oil, mix with small knife or spatula until a thin paste is produced.

Place the pivot polisher on the lathe and adjust the lap spindle so that it stands at the same height from the bed as the lathe spindle. Adjust the index at the base of the polisher to ½ degree, so as to give the staff a slight taper toward the end when the grinding takes place. With the belting so fitted that the grinding surface of the lap and the surface of the staff rotate in opposite directions to each other, feed the lap up to the work by means of the hard rubber knob at the rear. Apply thinly, but evenly, the oil stone paste to the lap and grind the balance seat. Continue grinding until the balance just fits the seat. Be sure the under cutting is deep enough so that the front corner of the lap does not touch the staff. If this is the case the balance can be riveted true and flat when the staff is finished. Next, grind the collet axis to size. Now grind that portion of the staff between the cone of the pivot and the collet seat.

Grinding and Polishing a Cone Pivot—Clean the work of the grinding material with a piece of pith previously dipped in Benzole and hold it against the staff. Finish cleaning with a dry piece of pith. For the cone pivot the polisher is set with the spindle at right angles to the pivot with the index set at 0 degrees. It is further adjusted so that the center of the lap stands above the pivot as shown in Figure 6.

This not only reduces the straight portion of the pivot perfectly cylindrical but it also forms the cone, the shape of which can be varied by raising or lowering the spindle of the polisher.

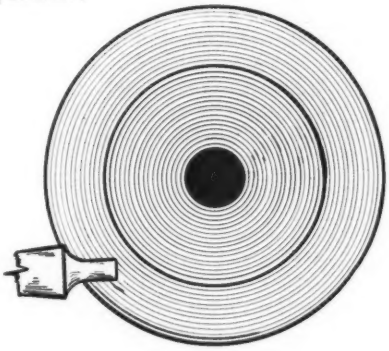

Figure 6.

Instead of the caste iron lap we now use a bell metal lap and a grinding medium crocus or Vienna lime. Reduce the pivot frequently trying the jewel until it fits rather closely. Now remove the bell metal lap and fit in its pace a tin or boxwood lap and polish the pivot using a paste of diamantine or sapphirine and oil prepared on the top story of the polishing block. Continue the polishing until the pivot fits the jewel freely. The slope between collet axis and cone may now be polished.

Turning Hub and Roughing Out Lower End of Staff—Now that the upper end of the staff is finished we next turn with the hand graver a long slope from balance seat to the lower end of the staff. With the pivot polisher set at the necessary angle grind the slope for most of its length using oil stone powder and oil. Polish with bell metal lap, crocus and oil and finally with tin or boxwood lap and oil.

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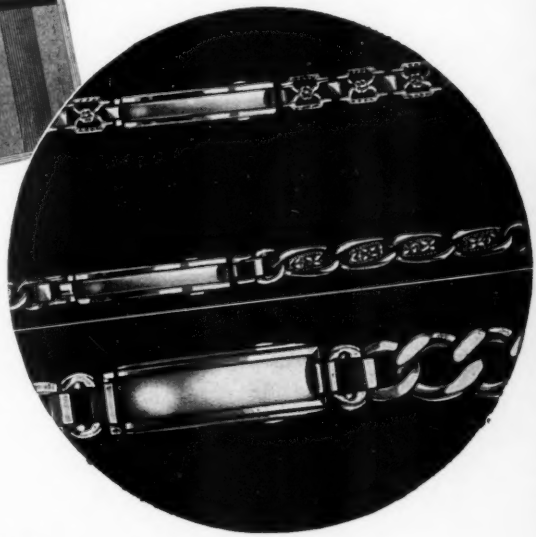

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WATCH ATTACHMENTS

MEN'S JEWELRY

Next cut out roughly the lower part with a graver slightly flattened at the point. Leave the hub a little longer than the finished staff is to be and the roller axis a little larger.

Cut off staff and measure the over-all length. The staff, of course, is a little too long. Place the collet axis in a split chuck and stone off the lower end until the staff is worked down to the correct length. Remove staff and re-measure the over-all length between the callipers of the Boley gauge as many times as is required, taking only a little off the end at a time so that the staff will not be made too short. This is positively the most exact method of bringing a staff to the correct length. Any other method such as measuring back from a pre-determined amount of extra length and cutting off after the work is cemented up is very likely to result in errors.

The Cement Chuck—The staff having been brought to the correct length we are now ready for the cement chuck. A screw brass lightly screwed in a chuck must have a center turned in it and deep enough to take the staff up to and including the hub. Bore a 0.3 millimeter hole in the bottom of the center to take the pivot. Figure 7 shows the center with the staff in place and properly secured in the cement.

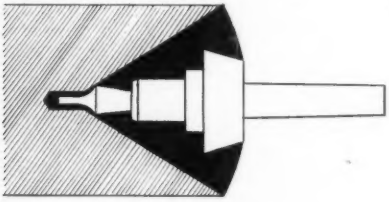

Figure 7

Setting the Staff in the Cement Chuck—Place a small alcohol lamp under the brass. Heat sufficiently so that the brass will melt the cement and fill the center, at the same time running the lathe slowly. While the cement is still soft insert the staff with the thumb and first finger. Again keep the lathe in motion, reheat the brass until the cement adheres to the staff. Holding the staff in place with a hollowed-out piece of pegwood resting on the T rest, continue running the lathe until the cement is slightly cooled. Now true up staff while cement is still soft by resting a pointed end of the pegwood on the T rest and bringing the pointed end against the roller axis. The T rest must be placed at an angle so that we may first hold the staff in place while allowing the cement to cool. The truing follows immediately by holding the peg wood in front of and at a right angle to the staff. It is convenient to have a hole in one end of the pegwood made by a graver or knife and a pointed or flattened end on the other. We merely reverse the pegwood in the operation.

Turning Lower End of Staff—Turn lower end of staff measuring from the end up to the roller seat and bring to the correct length. Reduce roller axis to 0.1 of a millimeter of the correct diameter. Set the pivot polisher in position with the index adjusted to one-half degree taper and grind roller axis until roller table slides on and wedges tight at a distance about two-thirds the way up to the hub. The pivot is next turned and polished as per instructions already given.

The staff is now removed from the cement chuck. Fill boiling pan or test tube with alcohol and boil off cement.

The ends of the pivots have not yet been finished but it is well first to try the staff in the watch and test for end shake, so we may better know in what manner to proceed. Since the measurement for the length was made without allowance for end shake, it usually follows that a slight touching up of the ends of the pivots is needed. To accomplish this place staff in a split chuck and flatten each end slightly using a hard Arkansas slip. Polish further with a Jasper slip

and finally finish with a hardened steel burnisher and round the corner slightly.

Common Errors in Staff Making—Beginners are very apt to overlook certain important details in the turning of a staff. One of the most common is the absence of a square shoulder for the roller seat so that the roller table will not lay flat to the full diameter of the hub. Under cutting for this purpose is not objectionable for many watch factory staffs are made in this manner.

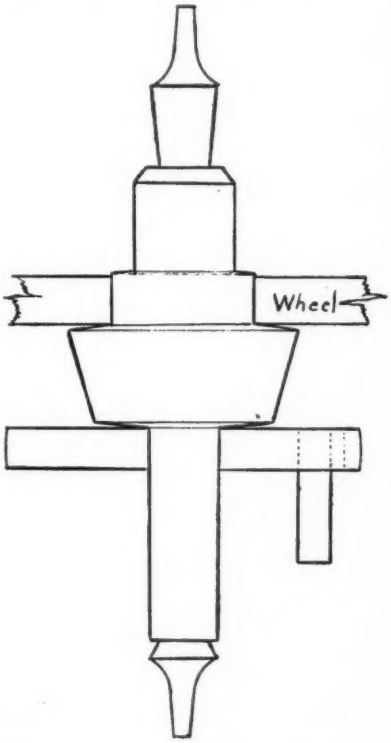

Figure 8

In like manner the balance wheel should fit the staff, that is, flat to the full diameter of the hub. The collet axis, the balance axis and the roller axis should show a definite taper so that the parts in question will fit properly. This is easily attained with the pivot polisher for the instrument may be set to the desired taper. In using hand gravers the eye must be trained to recognize a suitable taper.

The straight portion of the pivots should be cylindrical and not tapering as we sometimes find them, and the cones should be shaped alike. Again these conditions are made possible with the pivot polisher and likewise more difficult to attain without it. Satisfactory under cutting at the top of the balance seat is also important.

The errors stated above are all shown in Figure 8. Success will be realized if the beginner will pay strict attention to detail and it will be found that staff making is not as difficult as some workmen would have you believe.

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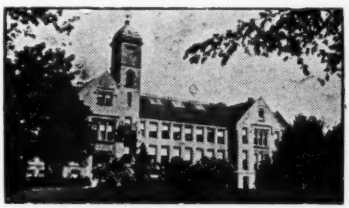

WATCHWORK
JEWELRY
STONE SETTING
ENGRAVING

Bradley Polytechnic Institute
School of Horology
DEPT. B PEORIA, ILL.
Established 1886

Nashville, Tenn. Legislation

(*Special to The American Horologist*)

By J. E. COLEMAN

The 72nd., General Assembly of Tennessee adjourned at 5:46 P. M. yesterday without enacting into law; for the second time in as many years, the plea of some six-hundred of its watchmaker citizens for a licensing Board.

Tuesday afternoon (Feb 11th.,) House Bill No. 625, on third and final reading, failed for lack of Constitutional Majority, the vote being recorded as 43 Ayes. 51 being necessary to pass.

This session was the shortest—41 days—since 1870; and in all probability the most hectic. Meeting defeat the second time has not dismayed the Watchmakers' of Tennessee one bit for already plans are being talked up for the passage of the bill at the 1943 session. It is just 690 days until the 73rd., General Assembly convenes; the trend of opinion is to make every one of these days count toward success of the third effort.

The failure to muster a constitutional majority was not due to opposition; but rather to a lack of interest in the bill; one has to be familiar with the attitude of the lower house and the contributing factors to that attitude to accurately understand this absence of interest. This session was marked by strict administration control, the Governor having previously obtained pledges to limit it to 50 days (Constitution permits 75) and very early in the session the effort to make it 40 days were begun. The wielding of the "big stick" by the administration coupled with the extreme short (40 day) time limit brought about a condition that can best be described as "impossible." After the vote was announced on our bill; one Representative remarked to me; "That doesn't mean a thing, the mood this crowd is in now, they would vote against their own mother."

A check of the final vote shows that out of a possible 20 votes from the four large delegations, Memphis, Nashville, Chattanooga and Knoxville, 18 voted aye and 2 passed. Also that one representative who signed the bill at its introduction, Wilson of Van Buren county, voted no. Credit is due Rep. Louis Allen (Nashville) for assistance in bringing the bill out of the Steering Committee, and to Rep. Charles Rutherford Jr. (Nashville) for an excellent talk when he spoke to the bill before the House.

When we watchmakers look over the actions of this session, oft referred to as "the most amazine in Tennessee histsory" we are forced to the conclusion that some legislators rate us lower than drunken drivers (House Bill No. 287 to deprive drunken drivers of their license for only 60 days instead of 1 year. passed Aye, 70; No, 4), Jackasses, (House Bill No. 661 to set up a board for the enrollment of Jacks and Stallions, passed Aye, 58; No, 9), and bull-frogs, (House Bill No. 936 to regulate the taking of bull-frogs). We only asked for a little protection and a registration board; they denied us. Gave the protection to the intoxicated drivers and bull-frogs; and, the board to the Jackasses. If they wished to so rate us, why, that was their "august privilege" but the feeling can be mutual—thank God we live in a free country where one can think as he pleases and also set it to the printed page.

Ohio Watchmakers Association State Convention

March 15th and 16th

Columbus, Ohio

Watchmakers Legislation As It Looks

Those states presenting watchmakers legislation report enthusiastically. Massachusetts, Bill No. 480, chairman reports "I believe Massachusetts will be the third state to be successful in the passing of such laws."

New Mexico, very promising. Oregon feels that they will be the third state. Minnesota are very enthusiastic over the outlook of their attempt. Connecticut sends in encouragement. Ohio looks exceptionally good, they hope to be the third state registered. Colorado, making slow progress due to state reorganization work and all such bills as the Watchmakers presented are being held in abeyance by the legislators momentarily.

National Liquidation Fund Contest

This contest is now made available and within the means of all readers and members of the Association. For complete information contact National Headquarters.

The entree fee has been reduced to $2.00. Secure this latest information; it will pay you.

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Employes Honor Swartchild Family

Honoring the firm's 70th anniversary year, employes of Swartchild & Co., large Chicago supply house recently entertained members of the Swartchild family at a surprise luncheon at Hotel Sherman. Present were 3 sons of the late Samuel Swartchild, founder of the firm—J. G., W. G., and E. G., and 3 grandsons W. G. Jr., James and Robert K. All 6 are active in the company.

Pres. J. G. Swartchild was presented with a beautiful bronze plaque bearing his likeness and inscribed:

"In commemoration of the company's 70th anniversary and as a gesture of admiration and respect for those who maintain the Swartchild Tradition. Presented by the Employes."

Almost 150 employes of the Chicago office were present and letters and telegrams were received from Swartchild branch offices at New York, Boston, Dallas, Atlanta and Buffalo.

After a turkey luncheon an all-employe entertainment program was presented.

The Swartchild Family: Standing—Robt. K. James, Wm. G. Jr Seated— Wm. G., E. G. and J. G., president of the firm. J. J. Sullivan, with the company over 25 years, is at the right.

WHAT IS YOUR FAVORITE LOUPE ?

YOU'LL FIND THE ONE THAT GIVES YOU CLEAREST IMAGE AND LEAST EYE FATIGUE IN THE BAUSCH & LOMB LINE . .

Do you prefer a one-inch loupe, a 3½-inch, or have you need for a higher power glass? Your own jobber can show you an assortment of 25 models in the Bausch & Lomb *American-made* line of watchmakers' glasses. Included are achromatic glasses, combination power, and loupes with spring headbands. Each will give you long service, comfort and efficient seeing.

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The Newest in Assortments

This 72 Bottle Tu-Tone Wood Cabinet is used for systems shown below.

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by NAMES, MEASUREMENTS and FINGER PRINTS

A new arrangement of a comprehensive chart that covers 5 pages and gives 5 different measurements for each stem. The chart covers the popular movements that are in use today such as Bulova, Benrus, A. Schild, etc., in sizes 3¾ to 13 ligne. Page 1 gives the names, shapes and sizes of the 108 series that the 72 styles will fit. Page 2 is the measurement chart and gives 5 detailed measurements for each stem. Pages 3, 4 and 5 show the 108 Newall Finger Prints that the 72 stems will fit. These charts enable the correct selection of stem and series number by the setting parts. These stems will fit 178 or more watches.

No. 650 (1 Gross—2 in each Bottle)..... $6.50

SWISS STAFF SYSTEM

by MEASUREMENTS, NAMES and FINGER PRINTS

For the popular Swiss watches in use today, such as Bulova, Benrus, A. Schild, etc., in sizes from 3¾ to 13 ligne. The 4 page chart for this new assortment shows 80 Newall Series Numbers that the 72 different staffs will fit. There are many more watch models that these staffs will fit and room is left on the chart for your own notations. Page 1 is the name chart with size, shape, model and the Newall Series Number. Pages 2 and 3 show the Finger Print Chart with sizes and shapes. Page 4 is the new measurement chart with 4 measurements for each staff.

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CHICAGO, ILLINOIS

The Peerless "Automatic Reversing" Watch Cleaning Machine is the only machine that assures it user of a continuous flow of solution around watch parts in the basket; it eliminates, by its "Automatic Reversing" feature, air pockets that are bound to develop in any cleaning machine where the basket rotates in one direction continuously. The Peerless basket, rotating to the right for five seconds, then automatically reversing and rotating to the left for the next five, breaks up all the air pockets that might form.

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promoting some other
And NOW, in view of
possibility of increased
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parts) fitting on
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finest addi fea
passes through o
screen rather tha
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This divided b
clean more than on

The skeleton fra
eight louvre or f
rotates, forces a
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THESE FEATURES ARE EXCLUSIVE with the PEERLESS WATCH CLEANING MACHINE:

- **AUTOMATIC REVERSING**
  reverses rotation every five seconds and eliminates possibility of vortex forming in the solution. Basket and watch parts are covered with solution at all times. No other machine has this **automatic** feature!
- **CONTROL SWITCH**
  allows you to shut off "Automatic Reversing" should you at any time feel the need of working without it.
- **TURNTABLE TOP**
  with jars of solution and Drier keeps work in front of you all the time.
- **TELESCOPIC STEEL COLUMN**
  "Finger Tip Control". Raises automatically when released from jar.
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  works in conjunction with Drier to show when it is in operation.

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Square Jars plus automatic reversing are a double protection against vortex forming in the basket.

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Motor Switch and Rheostat Control conveniently located on base.

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Black Wrinkle Finish with Chromium trim.

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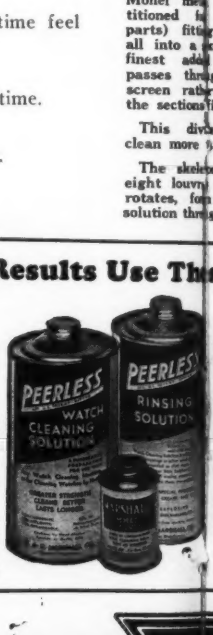

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A GREATER VALUE

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ing watches thoroughly and quickly with a Peerless Cleaning Machine . . . then spending the time saved g some other part of their business. It's the modern . . . more efficient way of doing business. W, in view of greater consumer spending during the defense program, you cannot afford to overlook the y of increased sales. Spend less time cleaning watches . . . more time promoting sales. Order a time- eerless Cleaning Machine today!

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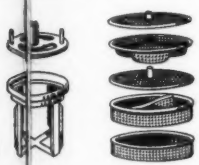

Basket is composed of three separate onel metal wire screen sections (par- ioned for different sizes of watch rts) fitting on top of each other and into a skeleton frame. Definitely the est added feature, as the solution sses through only one layer of wire reen rather than three or four where e sections fit into one another.

This divided basket allows you to ean more than one watch at one time.

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Where a very bad condition exists, you can save time by soaking movement 3 to 10 minutes in Gummed Oil Solvent. Loosens dried oil and dirt quickly and will not harm or discolor parts.

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Omaha Guild

New officers of the Omaha Guild are: Sten Nilsen, President; Frank Nosker, Secretary, 808 North 48th Street, Omaha, Nebraska. All watchmakers in the vicinity of the Omaha Guild should attend the regular meetings and participate in the group horological lessons.

Our Departed Brother

It is with great regret that we announce the death of our national trustee for the State of New Mexico, Mr. John O. Johnson, who passed away February 5 at Albuquerque, New Mexico, after a major operation.

Mr. Johnson was 43 years of age and the state association states, "To our group, Mr. Johnson was more than a member, he was a very dear friend to all. His humor and good sense were prime factors in welding our group into the unity and friendliness which we now enjoy. His passing creates a vacancy which is deeply felt by every member of the group."

Atlanta, Georgia Guild

Members of the Guild are taking advantage of the Atlanta Technical School of Aircraft Instrument Instruction opened by the United States Government on Tuesday evenings. The Guild members will spend two nights a week for the next six months taking this course.

At the last meeting Bishop Simpson, one of the instructors at the Technical School of Aircraft Instruments, was principal speaker and guest.

Two new members were admitted and the organization continues to grow.

Worcest. Guild Entertains Dignataries

Colonel William E. Bright of Waltham, national vice-president of United Horological Association of America, and G. Blaine Libbey of Milford addressed Worcester Guild, Massachusetts Horological Association, at a dinner meeting in Hotel Aurora February 19 on a bill for the registration of watchmakers in the state.

Guests at the meeting were Mayor Bennett, Harry L. Bustafson of the Chamber of Commerce, Rep. Anthony Doyle, Senator Charles F. Jeff Sullivan, Rep. Sven Erickson, Senator Harold R. Lundgren, Rep. Ernest A. Johnson, Rep. Stanislaus G. Wondoloski, Rep. Frank Clarkson, Rep. Henry Barbadora of Milford, and Rep. William F. Askin.

Entertainment was by Hazel and Marion Silvester, Accordion players; Teresa Cote, singer; Glee Young, soloist, and Rita Curnin, dancer. Irene Johnson led community singing.

NEW . . . **B. P. K.** . . . NEW

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WATCH CLEANING SOLUTION

1 Can of Concentrate Makes 1 Gallon Solution

Cleans In One Minute
Prevents Sticky Hairsprings

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Used With Any Practical Rinse
Does Not Color With Age.

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Capitol City Horological Guild

Held their regular meeting February 5. Several local watchmakers were welcomed as new members of our guild.

The men elected to the Board of Directors are: F. E. Brown, R. H. Bruhn, H. C. Hanger, O. E. Wampler.

Pierre Borel, our Technical Director, gave a very interesting talk on escapement work. Slides showing various escapements, added to the enjoyment of the evening.

The next regular meeting will be held March 5.

Cincinnati Guild

During the month of February held their regular guild meeting, as well as two special meetings; the special meetings were in behalf of legislation.

Over fifty members were present at the February 7 meeting, where reports of the Dance Committee were received and the profits of same turned over to the Legislative Committee.

Plans for the state convention, March 15-16, were made. Frank Foegler reported on state activities. The Cincinnati Guild voted a life membership to Mr. Frank Foegler in recognition for the work he has done.

The Education Committee, headed by Louis Bloesing, chairman, continued with Lesson No. 4. Reports are that more interest is being shown with every lesson and that their attendance is increasing as well as their membership.

Elmer G. Fisher, Vice-Pres.

Rhode Island Watchmakers Association

Held a very lively meeting February 20th at which time Mr. Henry Careete on the subject of Pulling Out of Stems and Their Correction.

Mr. William L. Robidoux displayed and explained his mystery clock, claiming that it is the smallest ever made.

Four of the R. I. members attended the New England Jewelers banquet held at Hotel Statler, Boston, Mass. February 8th. There were, Mr. Abisch, Mr. Gray, Mr. Coutu and Mr. Guertin.

The Worcester, Mass. Guild will attend our next regular meeting March the 20th to be held at the Narragansett Hotel, Providence, R. I.

Former member Mr. Walter W. Williams is now in Hollywood, California.

Rhode Island is rapidly moving up in first place for National membership mention and other states had better snap into it or Rhode Island will take the Honor Roll Trophy for 1941. They feel they should have it as Henry Ford is an honorary member of the state association.

Dayton Guild

At their January meeting installed the new officers as follows:

President—E. P. Clark
Vice-President—Carl Meineke
Secretary—S. V. Geile
Treasurer—M. C. Rife
Sgt. Arms—Ralph Apple

S. V. Geile, Secretary

H. I. A. Annual Meeting

The dates for the 21st Annual Meeting of the Horological Institute of America have been set. May 18, 19 and 20 are the dates chosen. This meeting marks the close of the 20th year of the Institute's activities and it is planned to make it a meeting long to be remembered. Details are not ready at present but the committees are at work on the plans which will be announced later. Three groups of Railroad Watch Inspectors and members and executives of the A. N. R. J. A. have signified their intention to be present and assist in making this meeting a notable one.

AERONAUTICAL INSTRUMENT SERVICE

Aircraft Instruments

EDITOR'S NOTE—Aeronautical Instrument Service is a subject untouched by publications in the Horological field, or in fact by any publication. In September, 1938, THE AMERICAN HOROLOGIST inaugurated such an educational service via prepared illustrated lectures to be used by U. H. A. A. organizations for the purpose of broadening our members' scope of knowledge in this field, which offered additional remuneration to those far-sighted enough to avail themselves of such knowledge.

ARTICLE No. 18

(Continued from February issue)

The indicator pointer deflects either way from zero, depending, first, upon the direction of rotation of the coil, which of course, is set; and, second, upon the direction of the horizontal component of the earth's magnetism relative to the vertical plane which the coil is passing at the instant when the brushes are in contact with its commutator segments. If the setting of the brushes is made with reference to a datum line on their mounting, this device is a means for showing the direction of that datum line with reference to the direction of the earth's magnetic field. So the earth inductor can be mounted on an aircraft to show its direction of heading. Of course, the currents generated by the device described are intermittent. However, the flickering of the pointer which is produced is nearly eliminated by having several coils, each with its own pair of segments on the cummutator. There is but one pair of brushes in any case, and they connect with the indicator. The rotation of the coil is accomplished by means of a small fan mounted on the generator and exposed in the slip stream (see fig. 56), or it may be rotated by a small electric motor. The generator by its own rotation is afforded gyroscopic stabilization. The brushes are set relative to the fore-and-aft axis of the airplane by means of the controller (fig. 54 ③), which is connected to the generator through a rigid shafting **S,** with the necessary universal joints and miter gear boxes. The ratio of reduction between the controller dial **D′** and the large gear that turns the brushes is 36 to 1. The shaft is connected directly to dial **D′**. Planetary gearing between dial **D′** and dial **D** gives a reduction ration of 36 to 1 also. This one turn of dial **D′** by means of the handle attached rotates both the brushes and dial **D** 10°. When installed the brushes are so adjusted that their position, which is controlled by the dials, represents the setting of the airplane's heading. Indicator **G** is connected by wires **W** (fig. 56) to the brushes. The pointer stands at zero when the course is being properly flown, to the left or right when the aircraft is headed off the course. The indicator also points to zero when a course 180° from that set is being flown. In this case a turn to the right causes a deflection of the pointer to the left and vice versa.

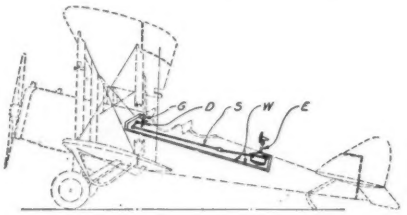


Fig. 56. Installation of the induction compass in DH-4 Airplane.

Installation and adjustment of distant-reading compass (wind-driven model).—So place the generator that the magnetic influence of ferrous structure is minimum and that the impeller may have the full advantage of a good air stream. So place both indicator and controller that they can

be read easily during flight and that they are near the turn or flight indicator and other navigational instruments. See that the impeller column is vertical when in flying position, and that the impeller is directed squarely into the air stream. So turn the generator that the control shaft connection is in the best position for attaching the shaft. Use miter gears and universal joints at points where bends in the shaft are necessary. Be sure to avoid any binding due to poor alignment. Fasten all bearing blocks and elbows securely. Connect the indicator to the brushes by 2-wire flexible cable firmly anchored throughout its length.

Head the aircraft on magnetic north. Loosen the most convenient shaft connection after making certain that all others are tight. So set the dials **D** and **D′** that the reference points stands at **N** and zero. Rotate the generator rapidly in the natural direction; that is, the direction in which the impeller would rotate it. While so doing, rotate the brushes until the indicator reads zero. Clamp the loosened connection. Turn the airplane a few degrees either way while turning the generator as directed above. If the pointer indicates the direction of the turn it is properly set. If the indication is opposite to the turn made, loosen the same connection and, while holding the shaft to the generator, turn the dial to read **S**-180. Then tighten the clamp. In lieu of the latter operation, the connections on the indicator may be reversed with the same effect. As a check, readings can then be made on other headings by swinging the aircraft similarly to the methods used for other compasses. The errors, if any are found to exist, may be recorded on a card (fig. 52) and used as a reference in flight.

Maintenance. — The instrument should be inspected occasionally, taking up the wear of adjustable thrust bearings and tightening all lock nuts. All working parts except the brushes and friction dampers should be well oiled (not excessively). The commutator should be cleaned by touching it lightly with 000 sandpaper.

Errors may occasionally develop on account of—

Loosening and slipping of the shaft connections.

Dirty or worn brushes and commutator.

Loss of sensitivity may occur owing to—

Dirty brushes or commutator.

Excessive friction having reduced the speed of rotation.

Loose electrical connections.

The oscillation of the pointer during flight is usually due to insufficient friction damping.

Inclinometers (banking indicators) —Inclinometers are used for two general purposes:

To indicate whether the aircraft is properly banked for turning; that is, when there is no side slipping or skidding.

To indicate the inclination of the aircraft to the horizontal or vertical.

When used for the first purpose, the inclinometer is sometimes called a banking indicator. Types using a bubble, ball, liquid, pendulum, and various combinations of these devices are used when it is desired to know whether the aircraft is properly banked.

Where it is necessary to measure the exact inclination, as in bombing, photography, and navigation, simple inclinometers are not reliable, owing to the effect of accelerations. Gyroscopes or gyro-pendulums are used for these purposes.

Principles of simple inclinometers. —During a turn the resultant of a centrifugal force and gravity acts upon each object on the aircraft with the same magnitude and in the same direction. Liquids, bubbles, balls, and pendulums will, therefore, indicate this direction regardless of their weights or sizes. No combination of floats, weights, or liquids can ever be

made to indicate definitely any other direction without gyroscopic assistance. During a side slip without turning, the inclinometer indicates a direction which is vertical only after the side slip has become steady and all effects of inertia have ceased. Consequently, if the aircraft is suddenly thrown into a very steep side slip, the inclinometer does not indicate the true inclination for several seconds. During a turn made at the proper bank, the pendulum or bubble inclinometer should always read zero. If it does not read zero, it indicates the angle through which the bank should be changed. As an indicator

Fig. 57. Bubble Inclinometer

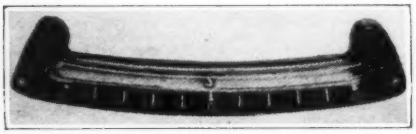


Fig. 58. Steel ball-in-glass-tube inclinometer

of bank, except for some large aircraft, this type of inclinometer is not as sensative as the pilot's face to the side wind. It is very useful with closed cockpits. It is not supposed to measure the inclination of the wings to the horizontal during a turn. This misconception of its purpose is very common and results in failure to get any use from the instrument. If used to indicate fore-and-aft inclinations, the simple inclinometer is correct only when the speed is constant and there is no pitching.

Types of simple inclinometers.— The bubble type (fig. 57) is a modification of the ordinary spirit level. Alcohol, sometimes colored with a dye, is the liquid generally used. A solution of 10 per cent fluorescein in alcohol is frequently used.

The steel-ball-in-glass-tube inclinometer (fig. 58) has an indicating device which is more natural to the pilot than the bubble type. The ball rolls toward the wing that is low. The direction of movement of the stick control which is required to correct the bank is the same as that of the ball to the zero.

AVIATION NEEDS
Instrument Men

Watchmakers and repairmen are ideally suited to this precision work. Cash in on your experience . . . with specialized instrument training for positions with airlines, aircraft plants, instrument makers, and at Army and Navy bases (in Civil Service). U. S. defense program creating urgent need for many instrument men. Choice of 4 courses—one all home study. For details, send coupon NOW.

AMERICAN SCHOOL of *Aircraft Instruments*
3903 San Fernando Road (Los Angeles)
Glendale, California, Dept. **AH-3**
Gentlemen: Please send me your free catalog.
Name _____ Age _____
Address _____
City _____ State _____

COSLEY JEWELRY COMPANY
Wholesale Dealers of
Jewelry, Tools and Jewelers' Supplies, Findings, etc.
301-302-303 University Building
Denver, Colorado

"Made In America"
That is the Cry of the Public Today
Why Not Follow the Slogan—
With a Full Stock of the World Famous
Sandsteel-Crosscurved Mainsprings
To be had in all sizes of American and Swiss
WM. WERKHAVEN
2595 N. High Street
COLUMBUS **OHIO**

Milwaukee District Guild

The first meeting of the Guild for 1941 was held at the Pfister Hotel on Tuesday evening, January 21st with about fifty watchmakers present. The meeting date was advanced one week because of the Joint Banquet, sponsored by the Wholesalers, Retailers and Watchmakers which was scheduled for Jan. 28th at the Elks Club.

Sergeant Walbert presented two interesting movies, courtesy of the U. S. Army Recruiting office, "The Army on Wheels" and a technicolor talking picture entitled "Service With the Colors", made by a prominent Motion Picture Company to glorify the American Soldier. These films were well presented with the best of equipment and were thoroughly enjoyed by all.

Mr. T. J. Bailey, Radio Interference Investigator, gave a lecture on "Sources, Location and Correction of Radio Interference". Mr. Bailey also gave a demonstration in connection with his lecture. This feature, courtesy of the Wisconsin Electric Power Co.

The following standing committees were appointed for 1941:

Membership — Conrad Katzenback, Chairman

Program — Ray Wichtowski, Chairman

Entertainment — Edward L. Moser, Chairman

Good & Welfare — Killian Kollross, Chairman

With the co-operation and efficient functioning of the above committees, Milwaukee District Guild hopes to break all previous records for membership.

Worcester County Guild No. 2

Officers were nominated at a general meeting of the Worcester Guild, February 4. A special dinner meeting was held in Aurora, February 19 for the state Senators and Representatives of Worcester and Worcester County, who were guests of the guild and state associations. They heard an explanation of the bill which will license watchmakers.

Officers will be elected March 3.

Elgin Student Top Honors

At the January 4th meeting of the Examining Board a remarkable showing was made by one of the Junior Watchmakers who scored 397 out of a possible 400 points, the highest grade ever recorded in the examinations. The young man is Eugene B. Heifner of the Elgin Watchmakers College.

EUGENE B. HEIFNER

Scientific Watch Repairs for the Trade

A service long needed by the jeweler, whose customers demand the highest type of workmanship.

Our shop is the most modern, using the latest scientific instruments.

Watch-Master Checks All Repairs.

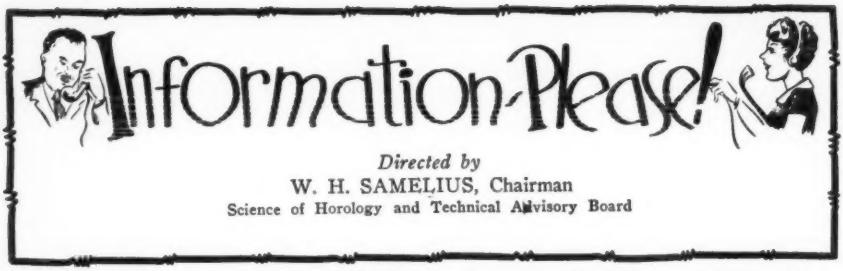
Only Genuine Materials Used.

O. R. Hagans & Co.

Dept. T 3226 East Colfax Avenue
Denver, Colorado

Martin Gluck and Son

SUPPLY SPECIALISTS TO THE TRADE
Clark Building Pittsburgh, Pa.



Directed by
W. H. SAMELIUS, Chairman
Science of Horology and Technical Advisory Board

A.C.B.—Why are the dots placed on the cover of the barrel and the barrel proper of Swiss watches. What are they for?

Answer—When fitting a cover to the barrel, the barrel proper is cemented in the lathe and trued to the hole. The cover is then snapped on and the hole in the cover is then bored to the proper size. The indicating marks are then placed on the cover and barrel so the assembly will be the same at all times.

This procedure assures us that the barrel will run perfectly true in the round and flat. In other words, the barrel will be perfecty upright.

R.W.A.—I have a watch where the cannon pinnion is lost. The minute wheel has 30 teeth, the minute pinion, 8 leaves; the hour wheel, 32 teeth. How can I determine the proper number of teeth for the cannon pinion?

Answer—While the minute hand revolves once per hour, the relation between the minute and hour hand is 12 to 1. That is, the cannon pinion must make 12 revolutions while the hour wheel goes once. As there are 32 teeth in the hour wheel and the minute pinion has 8 leaves, that would be a 4 to 1 ratio. Then, as the minute wheel has 30 teeth, we would have to have a pinion that would equal a three to one ratio and one third of 30 teeth would call for a 10 leaf cannon pinion.

T.E.W.—What is the quickest way to close holes in barrel which are not much worn and should properly be closed.

Answer—Select a stump with a slight hollow cone center, one that the bossing of the barrel will almost drop in flush. Then with a wide flat punch, drive the bossing down into the hollow center, contracting the metal, or closing the hole. You can then ream and polish the hole with a round broach.

P.E.M.—Can you tell what makes a watch gain dial up and dial down and keep time pendant up?

Answer—You will undoubtedly find that the ends of the bal pivots are flat which always cause the watch to run fast due to the friction causing a short arc or quick excursion. If you slightly round the end of the pivots, the friction will be brought nearer to center, allowing the balance to take a longer arc, causing a losing rate.

S.O.—I have several oilstone slips which have become rough and grooved. Can I restore a smooth surface.

Answer—The oilstone slips may be rubbed down smooth on a plate glass using medium emery and water and for final finish use flour emery with water.

R.S.—I have trouble in getting a bright cut on platinum and other metals. What do you recommend

Answer—When bright cutting, the graver should be polished with the cutting edge, that is, so the polished lines run parallel with the cutting edge. Some engravers use ordinary laundry soap dissolved in turpentine, with a consistency of vaseline, dipping the graver in this mixture for lubrication, will give a bright cut.

Horological Assn. of Pa. Inc. Third State Convention

By HERMAN R. PEDRICK
Convention Chairman

On March 16th The Horological Guild of Philadelphia will entertain The Horological Association of Pennsylvania, Inc. at their Third Annual Connvention at the Benjamin Franklin Hotel. It will consist of a morning and an afternoon session with a banquet at night.

There will be well known speakers, exhibits, technical discussions, entertainment, music, etc. Delegates and members will be present. The general jewelry trade is cordially invited to come out and help us to make our first Convention a grand success.

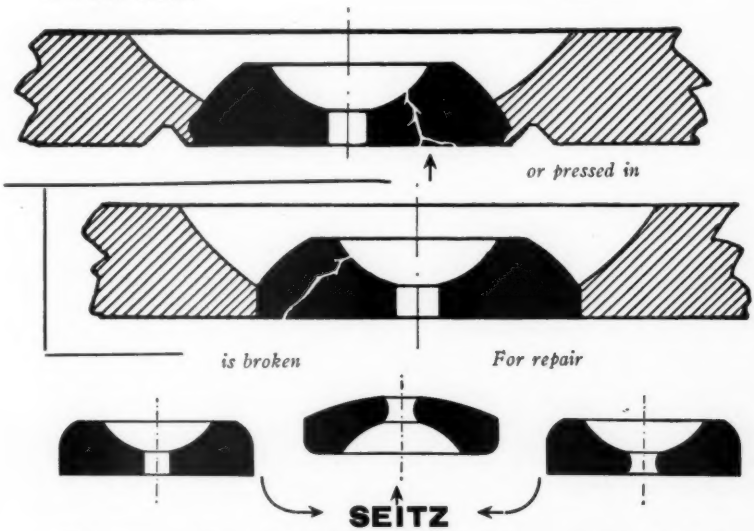
The committee is composed of the following: H. C. Holt, E. Britton, Robert McConway, O. E. Miller, Chas. Vogel, David Witkin, Ed Miller, Robert Franks, and Herman R. Pedrick, Chairman.

The State President, Geo. Niesslein, Vice President, H. O. Erwin, Secretary, J. Phillip Sommer, Treasurer, D. A. Kaufman, will be present. Also I. E. Binstock, Legal Advisor, will have a message for every one in the trade on the State Licensing law for Pennsylvania.

Hartford Guild

At their meeting of February 12th officers were elected for the ensuing year as follows:

President, Leonard Richman; Vice President, Arthur Gilman; Secretary, Nels W. Linden; Treasurer, Henry Cohn; State Com. Man, L. Rogers; State Com man, Ephrian Jones.



The finest quality of friction jewels — Precision, accuracy in their measurement.

FOR SALE BY ALL LEADING JOBBERS

Bergeon & Co., Le Locle, Switzerland

Wholesale Distributors

Hamilton Watch Company Wins Nation's Highest Award For 1940's Best Advertising Copy

Hamilton's full color, twin Christmas advertisements, so favorably received by the jewelry trade last fall, have just been awarded the nation's highest honors for excellence of copy. The formal presentation of the Annual Advertising Medal Award was made February 13 at a dinner held on the Starlight Roof of the Waldorf Astoria, in New York. The occasion, attended by more than five hundred nationally prominent advertising men and sales executives, was highlighted by the presence of Defense Commissioner William S. Knudson, radio commentator Raymond Gram Swing and advertising's own Bruce Barton.

The Annual Awards are open to any advertiser, agency or medium in the country, and, last year, entries were so numerous as to have still been over four thousand in number after the first elimination. A distinguished jury of 16 members finally decided on Hamilton's two submissions, "To Peggy" and "To Jim", hailing them as outstanding examples of the human interest school of advertising copy. Their public acceptance was demonstrated by the flood of letters and editorial comment from all over the country.

From Falmouth, Kentucky—"Congratulations on your 'To Jim' and 'To Peggy' ads. Don't think I've seen better. Please send watch folder. I want to get HER one for Christmas."

From Cody, Wyoming—". . .your excellent advertisement has sold for one typical housewife a Hamilton watch for a swell husband."

From Lexington, Kentucky—". . . those two ads do what ads rarely do — tug at the heartstrings — they are so effective. Honestly, I'd buy my wife a Hamilton for Christmas— if my wife needed a watch—if I had a wife!"

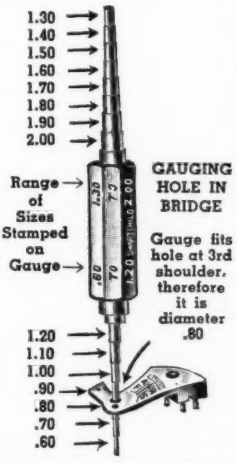
From New York City—". . .there will be another Hamilton in the family this Christmas."

From Nashville, Tennessee—"One of the best ever put out by any company. . .I've decided to replace my wrist watch with a Hamilton."

New Tool A Tremendous Help In Friction Jeweling

Today with thousands of friction-jewel style watches on the market, the watchmaker is called upon increasingly to replace broken friction jewels. The jeweling operation is simple enough but measuring the hole in the bridge or plate in order to select a jewel of the proper metric diameter is a time-wasting problem for many watchmakers.

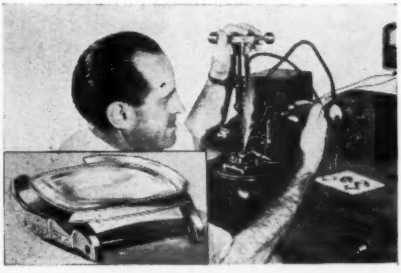
Swartchild & Co. has solved this problem completely for the watchmaker. They have invented a new and inexpensive gauge which instantly measures the hole in any bridge or plate and determines the exact metric diameter of the friction jewel required. This new gauge, made by a manufacturer of precision watch parts in Switzerland, is amazingly accurate. As shown in the illustration, it has shoulders which are in 10/100 m/m graduations indicating jewel diameters from .60 to 2.00 m/m. The gauge is merely inserted into the hole in any bridge or plate, and the shoulder at which it stops indicates the metric diameter of the jewel that will fit the hole friction tight.



PERM-O-SEAL CRYSTAL

The Most Practical and Beautiful Crystal you can buy

The superiority of Perm-O-Seal Crystals is beyond competition. It has required 20 years to perfect this Dutcher Brothers process, now in its 10th year of success.



Photograph shows Perm-O-Seal Crystal Machine in operation . . . and finished job with part of flash still attached before trimming.

Actual Samples Sent On Request

These beautiful crystals are made from a modern plastic material of remarkable clarity and with pronounced magnification qualities (it is entirely free from celluloid.) They add beauty to every watch on which they are installed.

A Perm-O-Seal Crystal is gently melted into the bezel under slight pressure at 225° Fahrenheit. After it has been trimmed and smoothed it is part of the bezel itself; unbreakable, dust and waterproof. It cannot come out or become loose due to shock or temperature change.

UNBREAKABLE AND WATERPROOF . . MELTED INTO PLACE AT 225° FAHRENHEIT . . HIGHLY POLISHED . . CAN'T FALL OUT . . UNCONDITIONALLY GUARANTEED for 1 YEAR.

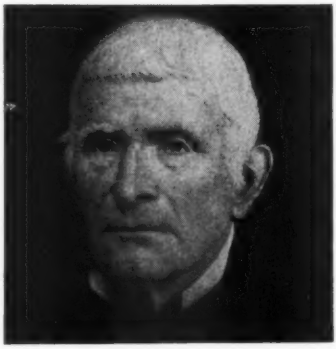
Dutcher Brothers

10 WEST 47th STREET, NEW YORK

"Connecticut Clockmaking"

By MR. EDWARD INGRAHAM
President E. Ingraham Clock Co.

The next man to leave a real impression on the clock business was Chauncey Jerome of Bristol and New Haven. He conceived the idea that a one-day brass movement could be made to replace the cheap one-day wooden movement, and is remembered because of his connections in the clock business with P. T. Barnum and because of the written record he left behind him. Chauncey Jerome's History of the American Clock Business, published in 1860, is still mighty good reading and helps give us a picture of the early makers. Chauncey was born in Canaan on June 10, 1793. His father was a blacksmith and wrought nailmaker who early moved to Plymouth. There the boy, before he was 15 years old, was "bound" to a house carpenter who treated him very well. Chauncey had ambition and plenty of plain guts. It could not have been long before he arranged for his release from his apprenticeship, because while still in his 'teens he was using his talents as a woodworker in making clock cases and peddling clocks. I shall not try to follow his career but cannot refrain from quoting a few incidents related in his biography. He writes: "The next summer was the cold one of 1816, which none of the old people will ever forget, and which many of the young have heard a great deal about. There was ice and snow every month of the year. I well remember on the 7th of June, while on my way to work, dressed throughout with thick woolen clothes and an overcoat on, my hands got so cold I was obliged to lay down my tools and put on a pair of mittens which I had in my pocket. It snowed about an hour that day. On the 10th of June, my wife brought in some clothes that had been spread on the ground the night before, which had been frozen stiff as in winter. On the Fourth of July, I saw several men pitching quoits in the middle of the day with thick overcoats on, and the sun shining bright at the same time. A body could not feel very patriotic in such weather. I often saw men when hoeing corn, stop at the end of a row and get in the sun by a fence to warm themselves. Not half enough corn ripened that year to furnish seed for the next. I worked at my trade, and had the job of finishing the inside of a 3-story house, having twenty-seven doors and a white oak matched floor to make, and did the whole for eighty five dollars."



SETH THOMAS

Certainly life was very different 100 years ago. Nothing illustrates that better than to compare Jerome's life story with that of one of our Twentieth Century clockmakers. Surely we are "softies." He lead a hard life—physically and mentally. There are many obvious reasons why 100 years ago he could not enjoy the physical comfort that his successors now enjoy. I suspect that much of his worry might have been avoided if he had had our numerous modern means of communication. In the time which has elapsed since Jerome went through his business career, we have made tremendous strides, yet the "tired business man" has a few problems left to deal with. Need we rehearse them? "The New Deal," financial problems, taxes, labor rela-

tions, markets, politics, and so forth ad infinitum.

Jerome was in the clock business from 1816 until about 1860. His greatest accomplishment came in the hard times of 1837. While in the South on a business trip, he invented a one-day brass clock, which he figured could be made much cheaper than the wood clock. On his return, he told his brother, Noble Jerome, what was on his mind. As Chauncey himself says, his brother was a first rate clockmaker who said he would go right to work and get up the movement, which he perfected in a short time, and presto—the Yankee clock business went through another revolution. It was then far more drastic than the revolution which hit the clock business in the 1930's when the public suddenly accepted the electric clock, and some 200 or more manufacturers rushed into the clock business from which they soon hastily departed. Jerome's invention sounded the death-knell of the wooden clock movement though there were a few marketed as late as 1841. I have been told that once there were piled up outside of one of Bristol's old factories at least 2000 obsolete wooden movements. Kindling wood! Jerome, whose Bristol plant was to be completely destroyed by fire in 1845, now proceeded to rapidly develop his markets. He not only had to make thousands of one-day brass movements, but had to case them, so built a factory in New Haven, where his cases were made, and to which he transported his movements via the Northampton Canal, delivering them to the Bristol Basin at Plainville.

Jerome in his biography, tells how in 1842 he sent a consignment of brass clocks to Old England, making a bargain with Epaphroditus Peck of Bristol to take them out, and how he sent with him his son Chauncey, Jr. This Epaphroditus Peck later died in London. Jerome writes of a pleasing incident which occurred soon after the English business started. To quote: "I had always told my young men over there to put a fair price on the clocks, which they did; but the officers thought they put them altogether too low, so that they made up their minds that they would take a lot, and seized one shipload, thinking that we would put the prices on the next cargo at higher rates. They paid the cash for this cargo, which made a good sale for us. A few days after, another invoice arrived which our folks entered at the same prices as before, but they were again taken by the officers, paying us cash and ten per cent in addition, which was very satisfactory to us. On the arrival of the third lot, they began to think they had better let the Yankees sell their own goods, and passed them through unmolested, and came to the conclusion that we could make clocks cheaper and much better than their own people. Their performance has been considered a first rate joke to say the least." Jerome then boldly prophesies that "we are the people who will furnish all Europe with all their common cheap clocks as long as time lasts." Alas and alack—Jerome didn't count on the Germans, who years ago captured that market from the ingenious Yankee.

Poor Chauncey! Hard-working, God-fearing, generous, courageous enterprising—another pioneer! His

DIALS REFINISHED
CRYSTALS FITTED
LIGHTERS REPAIRED
★ ★ ★
OUR TRIPLE SERVICE
WILL SAVE YOU TIME AND MONEY.
All Work Guaranteed
Dependable Quality Since 1926
KIRK-RICH DIAL CORP.
Los Angeles
San Francisco
Oakland
Chicago
Seattle
Dallas
Detroit
Pittsburgh

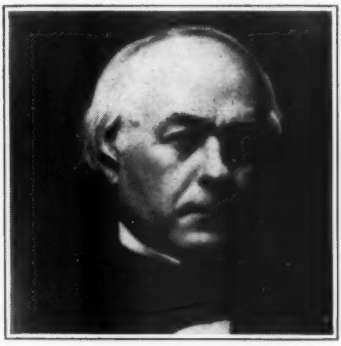
fire of 1845 was a heavy blow. He now moved to New Haven, where he resided for about 15 years, and served as Mayor of the City. During his life there he built a Church. About this time P. T. Barnum—the famous showman—delved into the clock business, and the firm of Terry & Barnum (Theodore Terry and P. T. Barnum) was formed and started operations in Bridgeport. According to Jerome, this concern was already heavily involved when they effected a consolidation with his company then known as the Jerome Manufacturing Company. Jerome says that this transaction was made and closed without his knowledge, as he was out of the state at the time. The result was bankruptcy for the Jerome Manufacturing Company and ruin for both Jerome and Barnum. Each accused the other of the responsibility for the failure, but it hardly seems that a man of Jerome's character should take the blame. (He never fully recovered, though Barunm succeeded in getting re-established after undergoing very severe reverses.) The business which has been done by the Jerome Mfg. Co. was taken over by the New Haven Clock Co. Jerome had much hard luck but I wonder if he was as good a business man as he makes out in his biography.

The early clockmakers made one great contribution which should not be overlooked. They created a demand for brass! Lathrop (who wrote extensively on the brass industry) says that the rising brass industry passed the experimental stage between 1820 and 1830, but it was in this so-called "experimental stage" that Joseph Ives perfected his rolled brass strap movement and only a decade later when the demand created by Chauncey Jerome's new one-day brass movement which was brought out in a terrible depression, must have given the brass industry a tremendous impetus. Of course other commodities also felt the effects of this growing industry.

Another associate of Eli Terry was Seth Thomas, born in 1785, died in 1859—after whom the town of Thomaston was named. Thomas served an apprenticeship to the trade of carpenter and joiner, and spent some time on the construction of Long Wharf in New Haven. On his majority he left his apprenticeship and as a very young man (the age of the common and ordinary variety of college graduate) he joined into partnership with Eli Terry and Silas Hoadley, who was six months younger than Thomas. Terry was very much the Senior partner in this enterprise, as he was then 35 years of age. (As Terry, Thomas & Hoadley they made clocks about 1809). In 1810 Terry sold his interests to these two callow youths, who carried on the business until 1814, when Thomas sold to Hoadley, moved and set up to manufacture wood clocks in Plymouth Hollow—now Thomaston. Seth Thomas had then reached the advanced age of 29, was a full fledged clockmaker on his own account, an economic royalist, and a genuine 24 karat rugged individualist. Jerome says of him, "Seth Thomas was in many respects a first rate man. He never made any improvements in manufacturing; his great success was in money making. He always minded his own business, was very industrious, persevering, honest, his word was as good as his note, and he always determined to make a good article and please his customers. He had several sons who are said to be smart business men." Why has his name endured? You have just heard what his competitor Jerome, who took no fancy to him, has to say of him. Doesn't that description tell us some reasons why he succeeded and his name survived? He made a lot of money and the "smart sons" carried on for three generations when the stockholders sold the business to the General Time Instruments Corp. which also operate the Westclox Company, but apparently one policy

was never lost track of: "he always determined to make a good article."

Will you forgive me for bringing my own family into this discussion? The picture is hardly complete without mentioning Elias Ingraham. Born in Marlboro in 1805, he learned his trade as a cabinet maker. Evidently learning that the going was good in the little town of Bristol, which then had some 1700 inhabitants, he must have put his joiners tools and spare clothing on his back, and in 1828 walked from Hartford to Bristol to get a job. In 1831 he bought a shop and paid taxes from then on as a mechanic. The panic of 1837 about floored him as he became heavily involved in debt, from which he was released just a century ago, when his brother Andrew came to his rescue. His early work was confined to cabinet making—furniture, chairs, mirrors, and clock cases, but when Jerome's brass movement became popular, he joined hands with a man named Ray and started making clocks in his own name in 1841. Successive partnerships prevailed until his plant was destroyed by fire in 1855. With characteristic Yankee perseverance he stuck to his guns until the last, which was in 1885. Elias Ingraham's flair for design, and his everlasting perseverance form his claims to fame. The design for which he is best known is the so-called Sharp Gothic clock, which had four pillars, two rising from either side of a gable roofed case, all four crowned with nicely turned finials. The story is told that he carved the model for this clock while returning from a trip to Caracas, Venezuela. The object of this trip is unknown, but I believe he took it because he wanted to find out more about mahogany, with which he worked as a cabinet maker. Tradition says that he took "French leave" from his wife as she had a sharp tongue, but as he came back again and lived with her happily ever after, this tale may not be true. Of Elias Ingraham, Edward Stevens, then Vice President of the New Haven Clock Co. said at a clock manufacturers meeting in New York in 1879 "that it was conceded by everyone competent to express an opinion, that Elias Ingraham headed the list of American clock manufacturers in the matter of designs." In 1907 one of Bristol's early historians, Milo Leon Norton, wrote that "George Mitchell who seems to have been the leading entrepreneur of his day, wanted to produce a clock case superior to Chauncey Jerome's bronze pillar clock, and hired Elias to do that job." Elias may have had designing talent —he also had persistence and progeny. The latter, thanks to the former attribute, have passed the business down even into the fourth and fifth generations, while the sixth is rearing its head, from the pillow.



CHAUNCEY JEROME

Two other men of the early period we will mention briefly for from their beginnings have grown two modern clock factories.

J. C. Brown was born in Coventry (Burnap's home), in 1805 and came to Bristol about 1833 when he bought an interest in one of the early clock factories. He may have learned clock making from Burnap. Until he failed in 1855 he was a leading figure in

many Bristol firms. The picture of his residence, which is still standing, appears in the lower glass of many an antique clock. After his failure, his interests were bought by Elisha N. Welch—a great figure in his day. Within a few years of Welch's death (he died in the little village of Forestville, leaving an estate of over three million dollars) his business was in bankruptcy, to be succeeded by the present Sessions Clock Co. of Forestville.

Riley Whiting of Winsted started making clocks there is 1807 in partnership with his brothers-in-law Samuel and Luther Hoadley. When these men retired, he continued in the business, making both Grandfather and shelf clocks, including the handsome pillar and scroll clocks, until his death in 1835, after which his business was taken over by William L. Gilbert.

While we may seem to have covered the history of a good many men, we have picked only a handful from the hundreds whose names are identified with the clock business in Connecticut. Carleton Buell—a Civil Engineer—of Bristol, made a careful study of the early town records, and has a list of over 200 names of Bristol clockmakers, whose labels appeared at one time or another in Bristol clocks alone. Time permits mention only of such men as J. C. Boardman, who made many O. G. clocks, the Darrows, who made clock tablets, Laporte Hubbell who made fine marines, B. B. Lewis and his perpetual calendar, George Mitchell who was the entrepreneur for many a Bristol clockmaker, the Downs, Birges, Atkins, Manross, Bartholomew, etc.

Time like an everrolling stream,
Bears all its sons away;
They fly, forgotten, as a dream
Dies at the opening day.

Let us then chronologically name the remaining clockmakers:

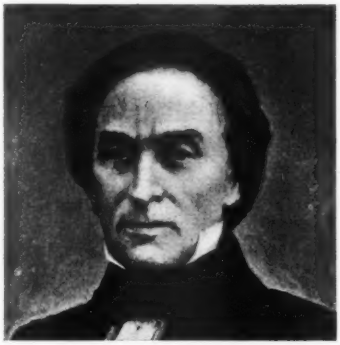
The Gilbert Clock Co., going back to Riley Whiting in 1807.

The Seth Thomas Clock Co., founded by Seth Thomas in 1813.

The New Haven Clock Co., going back to Chauncey Jerome, 1817.

The Sessions Clock Co., going back to J. C. Brown, 1827.

The E. Ingraham Co., founded by Elias Ingraham, 1831.



ELLIS INGRAHAM

The H. C. Thomas Clock Co., going back to Noah Pomeroy, 1847.

The Waterbury Clock Co., founded by Benedict & Burnham, 1859.

The Lux Clock Co., founded by Paul Lux, 1917.

You will note that five of the eight companies date their origins back over a century. It is hardly incumbent on me, a competitor, to challenge these claims to hoary antiquity. The early days of all of these companies are shrouded in the mists of time. To think that for four generations these companies have fought for their share of the trade and have stuck it out through thick and thin, is surely a tribute to those who have had to carry on. (Compared with man's mortality, company survival is high). I estimate that these eight companies employ in good times approximately 8500 hands, and influence, of course, the employment of many others. I have thus far only attempted to review the antecedents of the older survivors in the clock business, and to give you a sketchy

though rather lengthy review of the historical background of this Connecticut industry.

The past century has wrought many changes in the industry, a few of which we shall consider.

The greatest change has doubtless come in the dies, tools, and machinery used, particularly in the art of die making, though that has had to advance hand in glove with the improvements made in machinery, as well as the stock to be cut up. Sometimes it is difficult to know to whom to give the full credit for an improvemen. We suddenly discover that we can do today what we couldn't do before, but behind that discovery lies advancement in many fields. While we have learned to make better dies and cutting tools, we could not do so if others had not been able to furnish better machinery in which to use these dies and tools, and—a fact which is of equal importance—if the development of the quality of brass, **strip steel, tool steels, brass and steel rod,** and all kinds of material used by the industry had not kept pace with the tool development. There is little question but that the crying need for improvement in the clock business in the past has helped stimulate research leading to improvements which have inured to the benefit of all industry. In the woodworking field in which our industry is still interested, the developments have been less spectacular, though gradually vast improvements have been made in ripping up lumber, in veneer manufacture, in moulding and shaping lumber, and sanding and finishing. In the materials used in "case making" less change is noticeable. Mother Nature hasn't materially changed lumber, nails, screws, glue, and most mill supplies are little better, though doubtless much cheaper.

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Maurice G. Alperin, Treasurer of the Eastern Smelting & Refining Corporation of Boston, has been honored with an appointment by President Roosevelt, on February 3rd, as a member of the United States Assay Commission which news emanated from the Treasury Department.

Mr. Alperin is well known nationally through the Jewelry Industry not only by personal contact, but by correspondence.

Mr. Alperin has spent a lifetime associated with the Eastern Smelting & Refining Corporation who have been in the business of refining Precious Metals for nearly half a century.

The Eastern Smelting & Refining Corporation was founded by Mr. Alperin's father, Shol Alperin, in 1896; and today this Company is recognized as one of the most aggressive and active refining firms in the country.

Mr. Alperin is a member of the Boston Chamber of Commerce, Maritime Association of Boston, and the Jewelers' Board of Trade.

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